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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

TECH CENTER 1600/2900

(PCT Article 36 and Rule 70)

10/019902

Applicant's or agent's file reference EA-PCT-11177	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/06139	International filing date (day/month/year) 30 June 2000 (30.06.00)	Priority date (day/month/year) 30 June 1999 (30.06.99)
International Patent Classification (IPC) or national classification and IPC A61K 47/48		
Applicant SYNTESOME GESELLSCHAFT FÜR MEDIZINISCHE BIOCHEMIE MBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 05 January 2001 (05.01.01)	Date of completion of this report 30 May 2002 (30.05.2002)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-49, as originally filed,
 pages _____, filed with the demand,
 pages _____, filed with the letter of _____,
 pages _____, filed with the letter of _____.
- ☒ the claims, Nos. 1-24, as originally filed,
 Nos. _____, as amended under Article 19,
 Nos. _____, filed with the demand,
 Nos. _____, filed with the letter of _____,
 Nos. _____, filed with the letter of _____.
- ☒ the drawings, sheets/fig 1/3-3/3, as originally filed,
 sheets/fig _____, filed with the demand,
 sheets/fig _____, filed with the letter of _____,
 sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

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III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 1-24

because:

- ☐ the said international application, or the said claims Nos. _____
relate to the following subject matter which does not require an international preliminary examination (*specify*):

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____
are so unclear that no meaningful opinion could be formed (*specify*):

- ☐ the claims, or said claims Nos. _____ are so inadequately supported
by the description that no meaningful opinion could be formed.

- ☒ no international search report has been established for said claims Nos. 1-24

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: III

Due to a lack of clarity, the search was limited to
sialated conjugates, as follows from the examples. The
substantive examination was consequently restricted.

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PCT/EP 00/06139**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	1-24	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-24	NO
Industrial applicability (IA)	Claims	1-24	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents:

D1: REUTER J D et al.: "Inhibition of Viral Adhesion and Infection by Sialic-acid-Conjugated Dendritic Polymers"

BIOCONJUGATE CHEMISTRY, Vol. 10, No. 2, March 1999 (1999-03), pages 271-278, XP000804253 ISSN: 1043-1802

D2: ZANINI D et al.: "NOVEL DENDRITIC ALPHA-SIALOSIDES: SYNTHESIS OF GLYCODENDRIMERS BASED ON A 3,3'-IMINOBIS(PROPYLAMINE) CORE"

JOURNAL OF ORGANIC CHEMISTRY, Vol. 61, No. 21, 18 October 1996 (1996-10-18), pages 7348-7354, XP002042912 ISSN: 0022-3263

D3: WU W-Y et al.: "Synthesis of a polymeric 4-N-linked sialoside which inhibits influenza virus hemagglutinin"

BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, Vol. 10, No. 4, February 2000 (2000-02), pages 341-343, XP004189928 ISSN: 0960-894X

D4: Gambaryan A S et al.: "Specification of Receptor-binding Phenotypes of Influenza Virus Isolates from Different Hosts Using Synthetic Sialylglycopolymers: Non-EGG-adapted Human H1 and H3 Influenza A and

Influenza B Viruses Share a Common High Binding Affinity for 6'-sialyl-(N-acetyllactosamine)"
VIROLOGY, Vol. 232, No. 2, 9 June 1997 (1997-06-09),
pages 345-350, XP002068479 ISSN: 0042-6822

D5: Reuter J et al.: "Sialic acid conjugated dendritic polymers inhibit influenza virus binding to target cells in a structural and virus strain-specific manner"

Abstracts of the General Meeting of the American Society for Microbiology, Vol. 98, 1998, page 51
&: 98th General Meeting of the American Society for Microbiology; Atlanta, Georgia, USA; May 17-21, 1998, 1998 ISSN: 1060-2011

D6: YAMADA K et al.: "High performance polymer supports for enzyme-assisted synthesis of glycoconjugates"
CARBOHYDRATE RESEARCH, Vol. 305, No. 3-4, 1 December 1997 (1997-12-01), pages 443-461, XP004131532 ISSN: 0008-6215.

The present application claims conjugates of sialic acid with a dendrimer. If the chains of the dendrimer are longer, aggregates are formed which improve the presentation of the sialic acid groups. This basis of the invention is supported in the present application by a single comparative example (see Table 9, page 48).

The use of sialated polymers to inhibit viral cell adhesion is already known from, *inter alia*, D1 to D5. The invention on which the application is based differs from this prior art in that the chain length is increased.

Insofar as it relates to 6'SLN, the applicant has shown clearly that the claimed conjugates have a significantly improved effect. This improved effect could be used as an argument in support of an inventive step.

However, the comparative example for the compound No. 48 shows a lower activity compared to a comparable conjugate. Consequently, it is clear that the chain length is not responsible in all cases for the formation of aggregates and thus for the improved activity, but rather that the sugar group too has a certain influence on the effect of the conjugate produced. Accordingly, it is not possible to ascertain whether the difference as per the invention is in fact responsible for the improved effect.

Since the International Preliminary Examining Authority is unable to ascertain whether the difference between the prior art and the invention does in fact lead to the claimed improvement, it is not possible at present to acknowledge an inventive step for all of the claimed conjugates.

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(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: VI

Certain published documents (PCT Rule 70.10)

Patent No.	Publication date	Filing date	Priority date
WO 00 55149	21.9.2000	9.3.2000	12.3.1999

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VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The current claims relate to a conjugate, a method for the production of same, or the use of same, wherein the characteristic group R of this conjugate is defined merely by desired properties. The use of these parameters in the given context appears to give rise to a lack of clarity (PCT Article 6). It is not possible to compare the parameters chosen by the applicant with the disclosure of the prior art in this regard.